

The present invention is directed to a method of ALD deposition wherein the precursor gasses flow into the reactor chamber from an auxiliary chamber solely due to a pressure gradient between the two chambers. This method reduces the use of excess precursor gas and ensures the spatial uniformity of layers produced by the ALD process.

The Examiner has rejected claims 11-17 under 35 USC 102(e) as being anticipated by Sneh. In particular, the Examiner indicates that Sneh discloses a method of delivering precursor gasses for an ALD process that utilizes separate booster chambers for each chemical reactant, and valves for admitting the reactants to a reaction chamber. In addition, the Examiner states that the process of Sneh “is run solely under a pressure gradient” citing paragraphs 38 and 89. The Examiner also points to other sections of Sneh as teaching various aspects of the dependent claims of the present invention. These rejections are respectfully traversed and it is respectfully submitted that the present invention is patentably distinct from Sneh.

Contrary to the Examiner’s allegations, Sneh does not teach or suggest an ALD method wherein precursor gas flows from auxiliary chambers to an inlet of the process chamber solely under a pressure gradient as required by the present invention, (see claim 11). Rather, Sneh requires a relatively complex “Synchronous Modulation of Flow and Draw (SMFD)” process to achieve 1) short reaction times with good chemical utilization, and 2) minimum purge gas and chemical removal times while preventing backflow (See Sneh paragraph 22). In fact, the Sneh paragraphs cited by the Examiner as supporting pressure gradient flow, actually teach away from such a process. Paragraph 38 of Sneh clearly states that the first chemical reactant is provided to the deposition chamber by “flowing a first chemical reactant gas at a selected first-dosage flow rate and at an independently selected first-dosage pressure” comprising “controlling the first-dosage flow rate of the first chemical reactant gas into the deposition chamber and independently substantially matching a first-chemical draw of the first chemical reactant gas out of the deposition chamber”. Further, paragraph 89 of Sneh states that the flow of “chemically reactive gas into deposition chamber 114 conforms to an initial pulse that gradually decreases to the steady-state flow” with a concurrent draw pressure being applied the process chamber.

It is abundantly clear from the above passages that the flow into the process chamber from the booster chambers of the Sneh apparatus is not due solely to a pressure gradient. Therefore, Sneh clearly fails to teach or suggest the present invention wherein the precursor gasses flow from auxiliary chambers into the reactor chamber “solely under a pressure gradient”.

In light of the above, it is respectfully submitted that claims 11-17 of the present invention are patentably distinct from Sneh and it is respectfully requested that the rejection of such claims under 35 USC 102(e) be withdrawn.

The Examiner has also rejected claims 18-19 under 35 USC 103(a) as being unpatentable over Satta et al in view of Sneh, and claim 20 under 35 USC 103(a) as being unpatentable over Sneh in view of Kang. These rejections are respectfully traversed and it is respectfully submitted that the present claims are patentably distinct from the references cited.

In each of the above rejections the Examiner relies on Sneh for the teachings as set forth in the rejection of claims 1-17. In this light, it has already been shown that Sneh fails to teach or suggest the present invention wherein the precursor gasses flow from auxiliary chambers into the reactor chamber “solely under a pressure gradient”. It is also clear, and the Examiner does not suggest, that neither Satta et al nor Kang overcome the deficiencies of Sneh.

Therefore, it is respectfully submitted that claims 18-19 of the present invention are patentably distinct from Satta et al in view of Sneh and it is respectfully requested that the rejection of such claims under 35 USC 103(a) be withdrawn.

Further, it is respectfully submitted that claim 20 of the present invention is patentably distinct from Sneh in view of Kang and it is respectfully requested that the rejection of such claim under 35 USC 103(a) be withdrawn.

It is respectfully submitted that the present application is now in condition for allowance and further action consistent therewith is respectfully requested.

Respectfully submitted,



David A. Hey
Attorney of Record
Registration No. 32,351

Date: _____

The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974
(908) 771-6385